

Application Serial No. 09/311,014  
Amendment dated April 14, 2004  
Reply to office action dated January 15, 2004

Remarks/Arguments

Applicants have received and carefully reviewed the Office Action of the Examiner mailed July 1, 2004. Claims 1-34 remain pending in the application.

In paragraph 2 of the Office Action, claims 1, 2, 9, and 31 were rejected under 35 U.S.C. 102(b) as being anticipated by Bane (US 5,481,259). With respect to claims 1, 9, and 31, the Examiner states that Bane teaches a system comprising: at least one master unit; a plurality of remote units including means for sensing external conditions and generating sensor data and wirelessly communicating with the master unit; means for calculating a schedule of transmissions from the remotes to the master unit; wherein the means for transmitting from the master unit to the remote units includes transmitting at least part of the schedule; and timing means in the remote units for enabling the remote to transmit external sensor data to the master in accordance with the schedule (Bane see especially fig 4, col 4, line 60 – col 5, line 52).

After careful review, Applicant must respectfully disagree. Turning first to claim 1 which recites:

1. (Currently Amended) A building monitoring system utilizing bi-directional radio frequency communication comprising:
  - at least one master unit including a radio frequency transmitter and receiver;
  - a plurality of remote units having a radio frequency transmitter and receiver, said remote units capable of transmitting to and receiving from said master unit; and
  - said master unit includes a master scheduler that provides non-colliding predetermined remote transmission communication times for each of said remote units, wherein there is greater than 1 second between scheduled remote transmission communication times for at least some of the selected remote units, said remote units have a timer coupled to a controller for enabling said remote units to communicate at said predetermined remote transmission communication

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times with said master unit.

As can be clearly seen, claim 1 as amended recites a master unit that includes a master scheduler that provides non-colliding predetermined remote transmission times for each of said remote units and the remotes have a timer coupled to a controller for enabling said units to communicate a said predetermined remote transmission times with said master unit.

In contrast, Bane appears to partition a plurality of remote units into two or more groups (see Bane, column 4, lines 60-66), where each group is assigned a different wake-up period (see Bane, column 5, line 12-13). During a read cycle, all remote units in a particular group are awakened at the same time (see Bane, column 5, lines 17-20). After the group of remote units is awakened, the meter reading device appears to sequentially interrogate each of the awakened remote units by sequentially provide a transmission request addressed to each of the remote units. For example, Bane state:

The read process consists of providing a repeating transmission message from the meter reading device 15 which requests information from a meter interface unit 12 and simultaneously indicates to each unit in all groups to remain in an active communication mode. Upon completion of acquiring information from a first unit, a second unit is interrogated. The process continues for all units of group 1. When sharing a single communication channel, the awaking meter interface units must monitor the channel long enough to cover the gap in transmission while other meter interface units respond. After completion of reading group 1 all of group 2 would be awake and ready to be read.

(Emphasis Added)(Bane, column 5, lines 20-32). As can readily be seen, in Bane, a group of remote units is awakened at a particular time, and then the meter reading device sequentially interrogates each of the awakened remote units. Thus, the "wake-up" periods of Bane appear to

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merely determine when a group of remote units are awakened, and clearly do not dictate when the remote units actually transmit data to the meter reading device.

As can readily be seen, Bane clearly do not disclose or suggest remote units that have a timer coupled to a controller for enabling said remote units to communicate at said predetermined remote transmission times with said master unit, wherein the predetermined remote transmission times for each remote unit are provided by a master scheduler of the master unit, as recited in claim 1. The Examiner appears to acknowledge this in paragraph 2 of the Office Action by stating: "Bane's wake up period would be a predetermined communication time, since the claim does not specify that it is a predetermined remote transmission time." and in paragraph 3 by stating "Bane lacks a teaching of the master unit sending transmission times, thereby allowing the remotes to automatically transmit at the scheduled times without the master having to interrogate them." In view thereof, claim 1 is clearly not anticipated by Bane. For similar and other reasons, claim 2 is also clearly not anticipated by Bane.

Turning to claim 9, which recites:

9. (Previously Presented) A bi-directional building monitoring system comprising:

at least one master unit including means for wireless transmission and reception of data;

a plurality of remote units, wherein each of said remote units include means for wireless transmission of data to said master unit and means for wireless reception of data from said master unit, said remote units further include means for sensing external conditions and generating external sensor data;

means for calculating a schedule of periodic transmissions from said remote units to said master unit, wherein there is greater than 1 second between periodic transmissions for at least some of the selected remote units;

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wherein said means for transmitting from said master unit to said remote units includes means for transmitting at least part of said schedule to said remote units; and

timing means in said remote units for enabling said remote unit to transmit said external sensor data to said master unit in accordance with said schedule.

For similar reasons discussed above, as well as others, claim 9 is believed to be allowable over Bane.

Turning to claim 31, which recites:

31. (Currently Amended) A building monitoring system utilizing bi-directional radio frequency communication comprising:

at least one master unit including a radio frequency transmitter and receiver;

a plurality of remote units having a radio frequency transmitter and receiver and at least one sensor, said remote units capable of transmitting to and receiving from said master unit, said remote units also adapted to transmit a message including sensor data to said master unit; and

said master unit includes a master scheduler that provides non-colliding predetermined remote transmission communication times for each of said remote units, said remote units have a timer coupled to a controller for enabling said remote units to communicate and deliver a complete message including the sensor data to the master unit during each of at least selected predetermined remote transmission communication times.

For similar reasons discussed above with claim 1, along with others, claim 31 is clearly not anticipated by Bane.

In paragraph 3 of the Office Action, claims 3, 5, 6, 7, 10, 12-18, 32, 33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bane in view of Gaucher (US 6,175,860).

With respect to claim 3, 6, and 32, the Examiner states: "It would have been obvious to one of ordinary skill in the art to modify Bane to have the master transmit the scheduled transmission times, thereby allowing for the remotes to automatically transmit at the scheduled times without

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the master having to send an interrogation signal, eliminating the delay caused by the master being required to send individual interrogation signals and eliminating the possibility that the remotes might miss the interrogation signal due to interference.”

After careful review, Applicant must respectfully disagree. Turning to claim 1, which recites:

1. (Currently Amended) A building monitoring system utilizing bi-directional radio frequency communication comprising:
  - at least one master unit including a radio frequency transmitter and receiver;
  - a plurality of remote units having a radio frequency transmitter and receiver, said remote units capable of transmitting to and receiving from said master unit; and
  - said master unit includes a master scheduler that provides non-colliding predetermined remote transmission ~~communication~~ times for each of said remote units, wherein there is greater than 1 second between scheduled remote transmission ~~communication~~ times for at least some of the selected remote units, said remote units have a timer coupled to a controller for enabling said remote units to communicate at said predetermined remote transmission ~~communication~~ times with said master unit.

According to the MPEP, “all the claim limitations must be taught or suggest by the prior art.”

(2143.03) As can be clearly seen, claim 1 teaches predetermined remote transmission time of greater than 1 second between scheduled remote transmission time between selected units. As stated in Bane:

In FIG. 4, the plurality of meter interface units are separated into 10 groups with each of the groups having 100 meter interface units, for a total of 1000 units in meter system 400

(column 4, lines 60-66) and

we will assume for the system in FIG. 4 that it takes 100 milliseconds to read the data from each of the plurality of meter interface units. Therefore, in order to

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read the 1000 meter interface units in system 400 it will take approximately 100 seconds

(column 5, lines 7-11). (Emphasis added) Bane teaches groups of units that are communicated to 10 seconds apart to "wake-up" the groups of units. However, there are 1000 units in a group. As can be clearly seen, the time between transmissions of units is 100 milliseconds. So the time between transmissions in Bane is an order of magnitude less than the greater than 1 second for a unit as recited in claim 1. Furthermore, as can clearly be seen, Gaucher relates to an automatic multi-rate wireless/wired computer network (see Gaucher, title), which appears to operate at relatively high data rates. At column 10, lines 38-56, Gaucher state that there are numerous ways a wireless network can access the channel or RF media including transmitting at the instant of request, listening before transmitting to avoid collisions with other devices (CSMA-CA), and reserving time slots for communication (slotted Aloha/TDMA), etc. However, and consistent with the "computer network" application of Gaucher, these communication protocols typically operate at relatively high data rates; often in the hundreds of mega hertz range. In fact, and to provide context, Gaucher refers to relatively low data rate devices as those not requiring more than 10's to 100's Kbps in data transmission (see Gaucher, column 8, lines 5-7). Thus, in Gaucher, the time between scheduled transmission times (e.g. the slots in TDMA) would be orders of magnitude less than the greater than 1 second recited in claim 1. In addition, nothing in Bane or Gaucher suggest providing greater than 1 second between scheduled transmission times for at least some of the selected remote units, as recited in claim 1. In view of the foregoing, claim 1 is believed to be clearly patentable over Bane in view of Gaucher. For similar and other

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reasons, dependant claims 2-8 are also believed to be clearly patentable over Bane in view of Gaucher.

Turning to claim 32 which recites:

32. (Previously Presented) A bi-directional building monitoring system comprising:

at least one master unit including means for wireless transmission and reception of data;

a plurality of remote units, wherein each of said remote units include means for wireless transmission of data to said master unit and means for wireless reception of data from said master unit, at least selected remote units further including means for sensing external conditions and generating external sensor data;

means for calculating a schedule of transmissions from said remote units to said master unit;

wherein said means for transmitting from said master unit to said remote units includes means for transmitting at least part of said schedule to said remote units ; and

timing means in said remote units for enabling said remote unit to transmit said external sensor data to said master unit during each of at least selected scheduled transmissions in accordance with said schedule.

According to the MPEP 2143.01:

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.

The first possible source of motivation is the nature of the problem to be solved. This clearly is not the same problem. The second possible source of motivation is the teachings of the prior art. Bane states: "the present method for reading a plurality of meters in a meter system provides for increased battery savings to the meter interface units, while at the same time the overall time it takes to access the information from the meter interface units is not increased." (column 6, lines 26-30) Bane teaches a method of reducing the power consumption in a method of reading a

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plurality of meters without increasing the time. Gaucher states: "It is therefore an object of the present invention to provide an automatic multi-rate wireless/wired computer network that creates both a wired and a wireless network around the computer with which new devices can be seamlessly added without significant human intervention." Gaucher teaches an automatic multi-rate wireless/wired computer network (see Gaucher, title), which appears to operate at relatively high data rates. Nowhere does Gaucher teach a meter reading system or reducing power consumption of the network. Thus, the teachings of Bane and Gaucher do not give a source of motivation to combine them. "The mere fact that references can be combined does not render the resultant combination obvious unless the prior art suggests the desirability of the combination." MPEP 2143.01. The third possible source of motivation to combine references is the knowledge of a person of ordinary skill in the art. A person of ordinary skill would not turn to Gaucher to modify Bane. As discussed previously, Bane is a meter reading or building monitoring system and Gaucher is a computer network system. Nowhere does Bane teach or suggest a computer network system. A person of ordinary skill would not turn to a computer network system to improve a building monitoring system. Therefore, a person of ordinary skill in the art would not combine Bane and Gaucher. Thus, at the time the invention was created, it was not obvious to combine Bane and Gaucher. Accordingly, Claim 32 is believed to be clearly patentable over Bane in view of Gaucher.

As to claims 10, and 12-14, the Examiner rejected them stating: "the system of Bane as modified by Gaucher would perform the steps. Turning to claim 10, which recites:

10. (Currently Amended) A method for allowing a remote unit to



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communicate with a master unit in a building monitoring system that has at least one master unit including a radio frequency transmitter and receiver, and a plurality of remote units having a radio frequency transmitter and receiver, said remote units capable of transmitting to and receiving messages from said master unit, the method comprising:

- a. determining a remote unit transmission communication-time for each remote unit to communicate with said master unit such that each of said remote unit times do not collide with each other, wherein there is greater than 1 second between remote unit transmission communication-times for at least some of the remote units;
- b. transmitting each remote unit transmission communication time to a corresponding remote unit;
- c. detecting when the remote unit transmission communication-time arrives for each remote unit; and
- d. communication a message between a corresponding remote unit and said master unit when each remote unit transmission communication-time is detected.

For similar reasons discussed above, along with others, claim 10 is believed to be clearly patentable over Bane in view of Gaucher.

Turning to claim 12, which recites:

12. (Previously Presented) A method for scheduling remote unit radio frequency message transmissions in a building monitoring system, the method comprising:

- a. providing at least one master unit including a radio frequency transceiver, and a controller for operating said transceiver;
- b. providing a plurality of remote units, wherein said remote units include a radio frequency transceiver capable of transmitting to said master unit transceiver and capable of receiving from said master unit transceiver, wherein said remote units have a target transmission period for transmitting a complete message to the master unit;
- c. providing means in said master unit for calculating a master schedule of predetermined remote unit transmission times for said remote units, wherein said predetermined remote unit transmission times are based at least in part on said remote unit target transmission periods, such that collisions are avoided between said predetermined transmissions;

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d. calculating said master schedule of predetermined remote unit transmission times based at least in part on said remote unit target transmission periods;

e. transmitting timing instructions based on said master schedule from said master unit to said remote units; and

f. transmitting messages from said remote units to said master unit at times based on said timing instructions.

For similar reasons discussed above, as well as others, claim 12 is believed to be clearly patentable over Bane in view of Gaucher. Also, for similar reasons, as well as others, dependant claims 13 and 14 are believed to be patentable over Bane in view of Gaucher.

Claims 7, and 15-18 were rejected by the Examiner as being unpatentable over Bane in view of Gaucher. However, for similar reasons discussed above, as well as others, dependant claims 7 and 15-18 are believed to be patentable over Bane in view of Gaucher.

Turning to claims 33 and 34, the Examiner stated that Bane's remote includes a timer.

Claim 33 recites:

33. (Previously Presented) A building monitoring system utilizing bi-directional radio frequency communication comprising:

at least one master unit including a radio frequency transmitter and receiver;

a plurality of remote units having a radio frequency transmitter and receiver, said remote units capable of transmitting to and receiving from said master unit; and

said master unit includes a master scheduler that provides non-colliding predetermined communication times for each of said remote units, said remote units have a timer coupled to a controller for enabling said remote units to communicate at said predetermined communication times with said master unit, said master unit transmitting a next predetermined communication time to each of at least selected remote units after reception during a current predetermined communication time.

However, for similar reasons discussed above, as well as others, claim 33 is believed to be

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clearly patentable over Bane in view of Gaucher.

Turning to claim 34 which recites:

34. (Previously Presented) A building monitoring system utilizing bi-directional radio frequency communication comprising:

at least one master unit including a radio frequency transmitter and receiver;

a plurality of remote units having a radio frequency transmitter and receiver, said remote units capable of transmitting to and receiving from said master unit and further having one or more sensors for sensing one or more environmental variables; and

said master unit includes a master scheduler that provides non-colliding predetermined communication times for each of said remote units, said remote units have a timer coupled to a controller for enabling said remote units to communicate at said predetermined communication times with said master unit, said predetermined times provided by the master scheduler for at least selected remote units being dependent on the expected rate of change of the one or more environmental variables sensed by the one or more sensors of the selected remote units.

For similar reasons discussed above, as well as others, claim 34 is believed to be clearly patentable over Bane in view of Gaucher.

In paragraph 4 of the Office Action, claims 8 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bane in view of Gaucher and further in view of Simionescu et al (US 5,963,650). The Examiner states that it would be obvious to one of ordinary skill in the art to modify Bane in view of Gaucher to equip the remotes with the tailored power consumption and power saving modes as taught by Simionescu in order to allow the power consumption to be tailored to the remote power requirements. However, for similar reasons discussed above, along with others, there is no motivation to combine Bane and Gaucher, and Simionescu does not

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provide any further motivation. Thus, dependant claims 8 and 11 are believed to be clearly patentable over Bane in view of Gaucher and further in view of Simionescu.

In paragraph 5 of the Office Action, claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Bane in view of Gaucher. The Examiner stated that Bane in view of Gaucher teaches everything claimed except for the specific format in which the transmit times are transmitted from the master being absolute delay. Official Notice is taken that it is notoriously well known in the art to transmit synchronized transmission times as absolute time. Therefore it would have been obvious to one of ordinary skill in the art to modify Bane in view of Gaucher to transmit absolute times in order to ensure that the transmissions are properly synchronized. However, for similar reasons discussed above, along with others, dependant claim 4 is clearly patentable over Bane in view of Gaucher.

In paragraph 6 of the Office Action, claims 19-26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bane in view of Gaucher and further in view of Gemar (US 6,414,963). Regarding claims 19, and 23-26, the Examiner stated that it would be obvious to one of ordinary skill in the art to modify Bane in view of Gaucher to use the bucket algorithm schedule method as taught by Gemar in order to allow for dynamic rate scheduling with fine granularity and maximize communication bandwidth. However, Gemar does not provide any further motivation to combine references. For similar reasons discussed above, as well as others, dependant claims 19 and 23-26 are believed to be clearly patentable over Bane in view of Gaucher and further in view of Gemar.

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Turning to claims 20-22, the Examiner states that in view of Gemar would determine transmission schedule based on the information received from the remotes, therefore the adjustable parameters of the bucket algorithm would also be based on the remote information. For similar reasons discussed above, along with others, dependant claims 20-22 are believed to be clearly patentable over Bane in view of Gaucher and further in view of Gemar.

In paragraph 7 of the Office Action, the Examiner allowed claims 27-30.

Applicant confirms that two Information Disclosure Statements were filed, one on 8-27-99 and another on 10-30-2000.

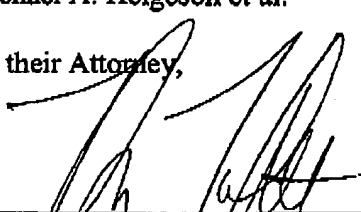
Reconsideration and reexamination are respectfully requested. In light of the above remarks, Applicants believe that all pending claims 1-34 are in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-677-9050.

Respectfully submitted,

Michael A. Helgeson et al.

By their Attorney,

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